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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/027,523	12/19/2001	Niranjan Damera-Venkata	10017903-1	3690

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EXAMINER	
SHERALI, ISHRAT I	

ART UNIT	PAPER NUMBER
2621	

DATE MAILED: 07/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/027,523	DAMERA-VENKATA ET AL.	
	Examiner	Art Unit	
	Sherali Ishrat	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23 and 25-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *27 and 28* is/are allowed.

6)☐ Claim(s) *1-14, 17-26,29 and 30* is/are rejected.

7)☒ Claim(s) *15 and 16* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *6*.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Response to Amendment/Arguments

1. This action is in response to applicant's amendment/arguments received on 3/18/04.

Applicant's arguments are fully considered, however they are moot due to new grounds of rejection.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-14, 17-23, 25-26 and 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yu et al. (US 6,700,992) in view of Cass et al (6,141,441).

Regarding claims 1 and 22, Yu discloses generating a graphical bar code (See Yu, col. 3, lines 6-8, Yu shows "embedding message in halftoned digital images" and col. 3, lines 55-56, "digital message image include graphic information associated with digital image", embedding message in halftoned digital image which include graphic information associated with digital image corresponds to generating a graphical bar code), comprising;

halftoning regions of an original image incorporating errors diffused among regions of the original image (See Yu, col. 3, lines 9-12, "digital message image embedding operation is integrated into error diffusion halftoning" and col. 4, lines 43-45, "the thresholding error is multiplied by a series of error weights and provided to the adder which adds the weighted difference signal to nearby pixels" corresponds to halftoning regions of an original image incorporating errors diffused among regions of the original image).

Yu however has not disclosed error computed based at least in part upon modulations in the graphical bar code corresponding to graphical encoding of a message.

In the same field of endeavor of Cass shows error computed based at least in part upon modulations (See Cass, col. 14, lines 55-63, "a small image region in the original color (carrier) image is paired with each signal block in message image. The color of that image region, referred to as target color of the signal block, is the color that is modulated according to the spatial subregion pattern of color difference quantities of respectively paired signal block", Cass disclosure of color that is modulated according to the spatial subregion pattern of color difference [error] quantities of respectively paired signal block corresponds to error computed based at least in part upon modulations).

in the graphical bar code corresponding to graphical encoding of a message (See Cass, col. 14, lines 55-58, "a small image region in the original color (carrier) image is paired with each signal block in message image" corresponds graphical bar code and

col. 14, lines 59-62, "color that is modulated according to the spatial subregion pattern of color difference [error] quantities of respectively paired signal block to produce an output signal block in the encoded image" corresponds to graphical encoding of a message).

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the teaching of Cass of error computation based at least in part upon modulations in the graphical bar code corresponding to graphical encoding of a message in the system of Yu by pairing digital message image and carrier image (See Yu, col. 3, lines 61-62) and modulating color according to the spatial subregion pattern of color difference (error) quantities of respectively paired signal block (digital message image and carrier image) to produce output signal block in the encoded image because such a system provide encoding of digital message image (graphical bar code) which is substantially imperceptible to human viewer (See Cass, col. 7, lines 13-15).

Regarding claim 2, Cass discloses halftoning comprise computing quantization error for respective regions of the graphical bar code (See Cass, See Cass, col. 14, lines 55-63 "a small image region in the original color (carrier) image is paired with each signal block in message image. The color of that image region, referred to as target color of the signal block, is the color that is modulated according to the spatial subregion pattern of color difference [error] quantities of respectively paired signal block" corresponds to computing quantization error for respective regions of the graphical bar code).

Regarding claim 3, Cass discloses quantization error are invariant to the graphically encode message (See Cass, figure 8, col. 15, lines 49-55, Cass shows "signal block is combined with a carrier image having color c1. Resulting output signal block sub regions of color c1+ d and c1-d, with an overall mean perceived color of c1" Cass ouput signal blocks perceived color is overall mean [average] color c1 therefore quantization error are invariant to the graphically encode message).

Regarding claim 4, Cass discloses wherein average block error are diffused (See Cass, figure 8, col. 15, lines 49-55, Cass shows "signal block is combined with a carrier image having color c1. Resulting output signal block sub regions of color c1+ d and c1-d, with an overall mean [average] perceived color of c1 therefore in the system of Cass average block error are diffused in the output signal block sub regions).

Regarding claim 5, Yu discloses modifying original image regions with diffused errors to produce corresponding regions of modified original image (See Yu, figure 3, col. 41-45, Yu in figure 3 input digital image is modified with error feedback [error diffusion] to produce corresponding regions of modified original image).

Regarding claim 6, Yu discloses matrix value error filter to compute quantization error (See Yu, col. 4, lines 40-44, modified message image is added to the input digital image and thresholded to compute thresholded error which corresponds to matrix value error filter to compute quantization error).

Regarding claim 7, Yu discloses quantization error are computed in part upon comparison of regions of the modified original image with corresponding regions of the graphical bar code (See Yu, col. 4, lines 40-44, modified message image is added to

the input digital image [bar code] and thresholded to compute thresholded error which corresponds to quantization error are computed in part upon comparison of regions of the modified original image with corresponding regions of the graphical bar code).

Regarding claim 8, Yu discloses quantizing regions of the modified original image to produce regions of the base image (See Yu, col. 4, lines 40-44, modified message image is added to the input digital image [bar code] and thresholded to produce halftoned digital image [base image]).

Regarding claim 9, Yu discloses quantizing comprise of thresholding regions of the modified regions of the original image (See Yu, col. 4, lines 40-44, modified message image is added to the input digital image [bar code] and thresholded to produce halftoned digital image [base image]).

Regarding claim 10, Yu discloses modified original image are thresholded at an intermediate gray level (See Yu, col. 3, lines 15-20, input digital image is N-bit, the halftoned image carries the message, the halftoned image is M-bit, where M is smaller than N and col. 3, lines 40-44, modified message image is added to input digital image and thresholded to produce halftone image. Since input digital image is N-bit and halftoned image is M bit therefore modified original [message] image is thresholded at an intermediate gray level).

Regarding claim 11, Cass discloses assigning to regions of the base image respective representative quantized regions selected from a subset of possible halftone regions (See Cass, col. 15, 32-41, Cass shows message image is combined with carrier image to produce encode image [base image] color modulation occurs in signal

block for each signal block in message image, color space direction ±d relative to the color c of paired image region in carrier image and output signal blocks are given c±d, i.e Cass shows assigning regions of the base image respective representative quantized regions selected from a subset of possible halftone regions c±d as shown in figure 4).

Regarding claim 12, Cass discloses subset of possible quantized regions consist of all dark and all bright quantized region (See Cass, figure 4, Cass in figure 4, shows subset of possible quantized regions consist of all dark and all bright quantized region).

Regarding claim 13, Yu discloses base image are modulated with a graphical encoding of message to produce corresponding regions of graphical bar code (See Cass, col. 15, 32-41, Cass shows message image is combined with carrier image to produce encode image [base image] color modulation occurs in signal block for each signal block in message image, color space direction ±d relative to the color c of paired image region in carrier image, output signal blocks are given c±d color, which corresponds to base image [carrier image] are modulated with a graphical encoding of message [message image] to produce corresponding regions of graphical bar code).

Regarding claim 14, Yu discloses generating a sequence of graphical code words corresponding to graphical encoding of the message (See Yu, col. 4, lines 40-44, modified message image is added to the input digital image and thresholded to produce halftoned digital image having the embedded message, pixels in the halftoned digital image having embedded message corresponds to generating a sequence of graphical code words corresponding to graphical encoding of the message).

Regarding claim 17, Yu discloses one or more graphical code words are non-information encoding and the remaining graphical code words are information encoding (See Yu, col. 4, lines 66-67, embedded message may include other information corresponds to graphical code words are non-information encoding and the remaining graphical code words are information encoding).

Regarding claim 18, Yu discloses information encoding and non-information encoding are distinguishable on the basis of average gray value (See Yu, col. 3, lines 15-20, input digital image is N-bit, the halftoned image carries the message, the halftoned image is M-bit, where M is smaller than N and col. 3, lines 40-44, modified message image is added to input digital image and thresholded to produce halftone image. Since information encoding is using halfoned image which is M-bit and which is part of digital image itself and digital image is N-bit therefore information encoding and non-information encoding are distinguishable on the basis of average gray value N-bit or M-bit).

Regarding claim 19, Yu discloses information–encoding graphical code words have gray values within a selected gray value range (See Yu, col. 3, lines 15-20, halftoned image carries the message, the halftoned image is M-bit, therefore information–encoding graphical code words have gray values within a selected gray value range).

Regarding claim 20, Yu discloses non-information encoding words do not encode modulation into the graphical bar code (See Yu, col. 4, lines 66-67, embedded message may include other information and Yu has not shown other information is modulation encoded).

Regarding claim 21, Yu discloses non-information encoding code words visually enhances regions of the bar code (See Yu, col. 4, lines 66-67, embedded message may include other information and other information are obviously can be used to enhance the bar code).

Regarding claim 23 and 29, halftoning regions of an original image incorporating errors diffused among regions of the original image (See Yu, col. 3, lines 9-12, "digital message image embedding operation is integrated into error diffusion halftoning" and col. 4, lines 43-45, "the thresholding error is multiplied by a series of error weights and provided to the adder which adds the weighted difference signal to nearby pixels" corresponds to halftoning regions of an original image incorporating errors diffused among regions of the original image).

decoding the sequence of the graphical code words to produce a decoded message (See Yu, col. 4, lines 55-60, the digitized image is cross correlated with a digital carrier image to produce an extracted message image corresponds to decoding the sequence of the graphical code words to produce a decoded message).

Yu however has not disclosed error computed based at least in part upon modulations in the graphical bar code corresponding to graphical encoding of a message and probabilistically comparing regions of the base image to a set of graphical code words to obtain a sequence of graphical code words corresponding to a graphical encoding of message.

In the same field of endeavor Cass shows error computed based at least in part upon modulations (See Cass, col. 14, lines 55-63, "a small image region in the original

color (carrier) image is paired with each signal block in message image. The color of that image region, referred to as target color of the signal block, is the color that is modulated according to the spatial subregion pattern of color difference quantities of respectively paired signal block", Cass disclosure of color that is modulated according to the spatial subregion pattern of color difference [error] quantities of respectively paired signal block corresponds to error computed based at least in part upon modulation).

in the graphical bar code corresponding to graphical encoding of a message (See Cass, col. 14, lines 55-58, "a small image region in the original color (carrier) image is paired with each signal block in message image" corresponds graphical bar code and col. 14, lines 59-62, "color that is modulated according to the spatial subregion pattern of color difference [error] quantities of respectively paired signal block to produce an output signal block in the encoded image" corresponds to graphical encoding of a message);

probabilistically comparing regions of the base image to a set of graphical code words to obtain a sequence of graphical code words corresponding to a graphical encoding of message (See Cass, col. 28, lines 15-20, Cass shows " optimal way to estimate [probabilistically] signal block sent from the signal received is to compute correlation [comparing] valid signal blocks [base image] with an image region which has been identified as received signal block [graphical code word]. The signal [code word] block that correlates the most is determined to be signal block sent" corresponds to probabilistically comparing regions of the base image to a set of graphical code

words to obtain a sequence of graphical code words corresponding to a graphical encoding of message).

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the teaching of Cass of error computation based at least in part upon modulations in the graphical bar code corresponding to graphical encoding of a message and probabilistically comparing regions of the base image to a set of graphical code words to obtain a sequence of graphical code words in the system of Yu by pairing digital message image and carrier image (See Yu, col. 3, lines 61-62) and modulating color according to the spatial subregion pattern of color difference (error) quantities of respectively paired signal block (digital message image and carrier image) to produce output signal block in the encoded image because such a system provide encoding of digital message image (graphical bar code) which is substantially imperceptible to human viewer (See Cass, col. 7, lines 13-15) and provide process of decoding of encoded message.

Regarding claims 25 and 30, Cass discloses diffused error are invariant to the graphically encode message (See Cass, figure 8, col. 15, lines 49-55, Cass shows "signal block is combined with a carrier image having color c1. Resulting output signal block sub regions of color c1+ d and c1-d, with an overall mean perceived color of c1" Cass ouput signal blocks perceived color is overall mean [average] color c1 therefore quantization error are invariant to the graphically encode message).

Regarding claim 26, Yu discloses base image is generated without foreknowledge of the original image (See Yu, col. 3, lines 61-63, carrier and message image convolved to

obtain modified message image [base image] and col. col. 4, lines 40-42, modified message [base image] is added to the input digital image i.e base image [modified message] is generated without foreknowledge of the original image [input digital image]).

Allowable Subject Matter

4. Claims 27-28 are allowable over prior art of record.

Claims 15-16 are objected as being dependent on rejected based claim but would be allowable if rewritten in independent form including limitations of the base claim and any intervening claims.

Communication

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sherali Ishrat whose telephone number is 703-308-9589. The examiner can normally be reached on 8:00 AM - 4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo Boudreau can be reached on 703-305-4706. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ishrat Sherali

Patent Examiner

Group Art Unit 2621

July 20, 2004

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